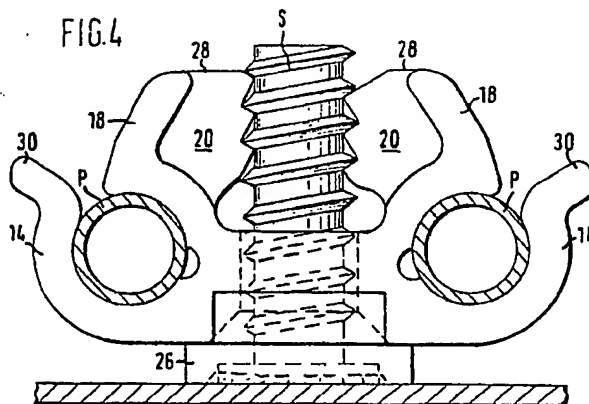
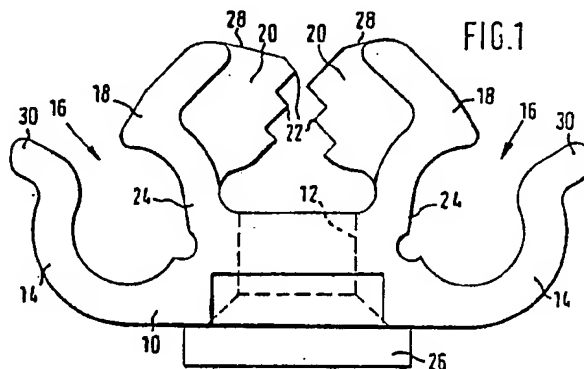


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(54) **Plastics pipe clip**

(57) A one-piece plastics pipe clip has one or more pipe-receiving portions, (16) one wall of which is provided by a yieldable element (18), at a rear side of which a stud-engaging portion (20) overlies a stud-receiving hole (12) in the clip body (10) so that the element will

close over a pipe (P) and secure it when the clip is assembled on a projecting stud (S). The pipe-engaging element may be integral with the stud-engaging portion (20) or be separated by a channel. The stud engaging portions (20) may have teeth (22) to engage a screw thread on the stud.



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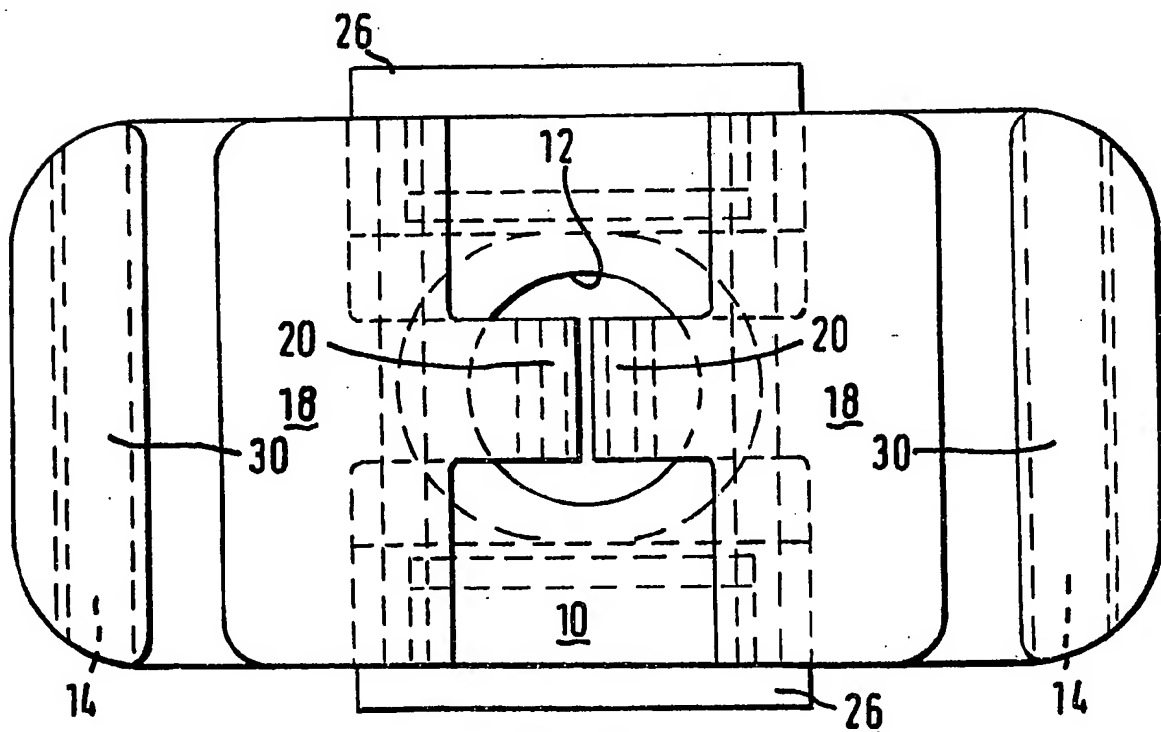
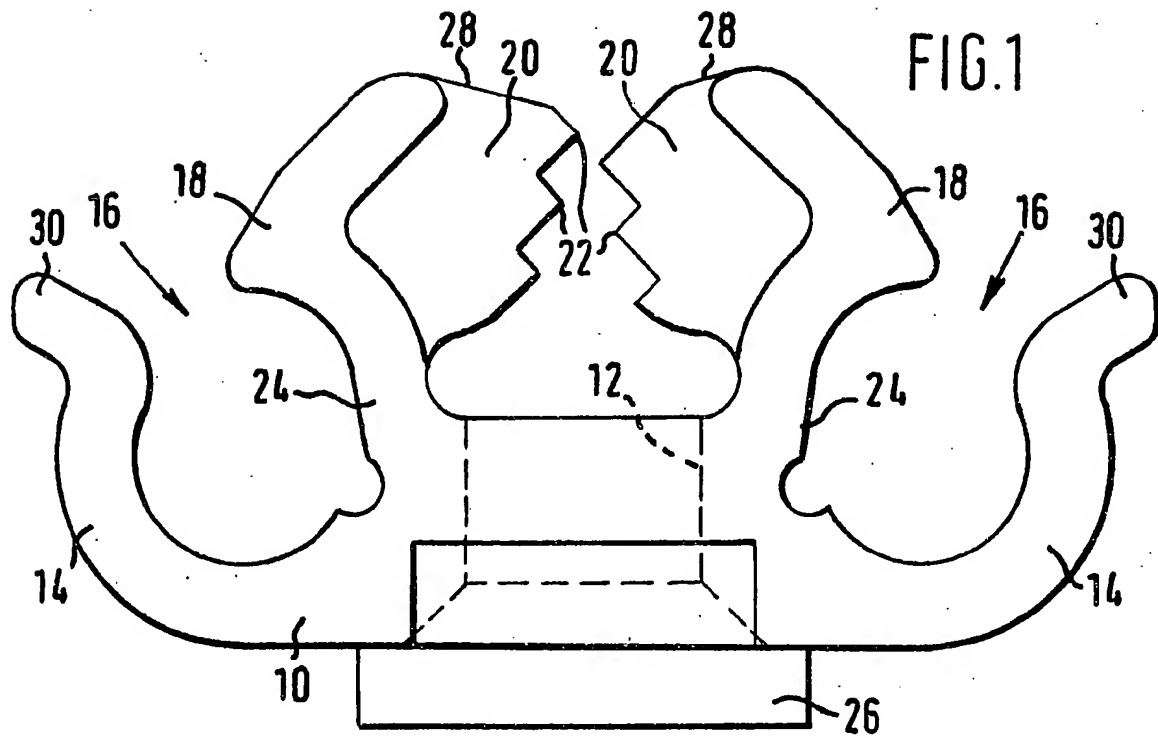


FIG. 2

FIG. 3

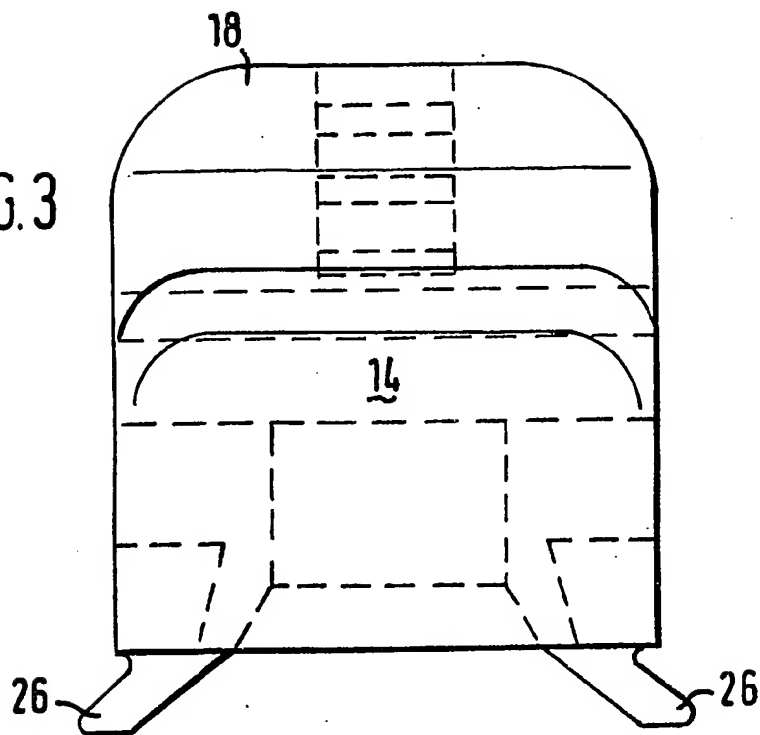
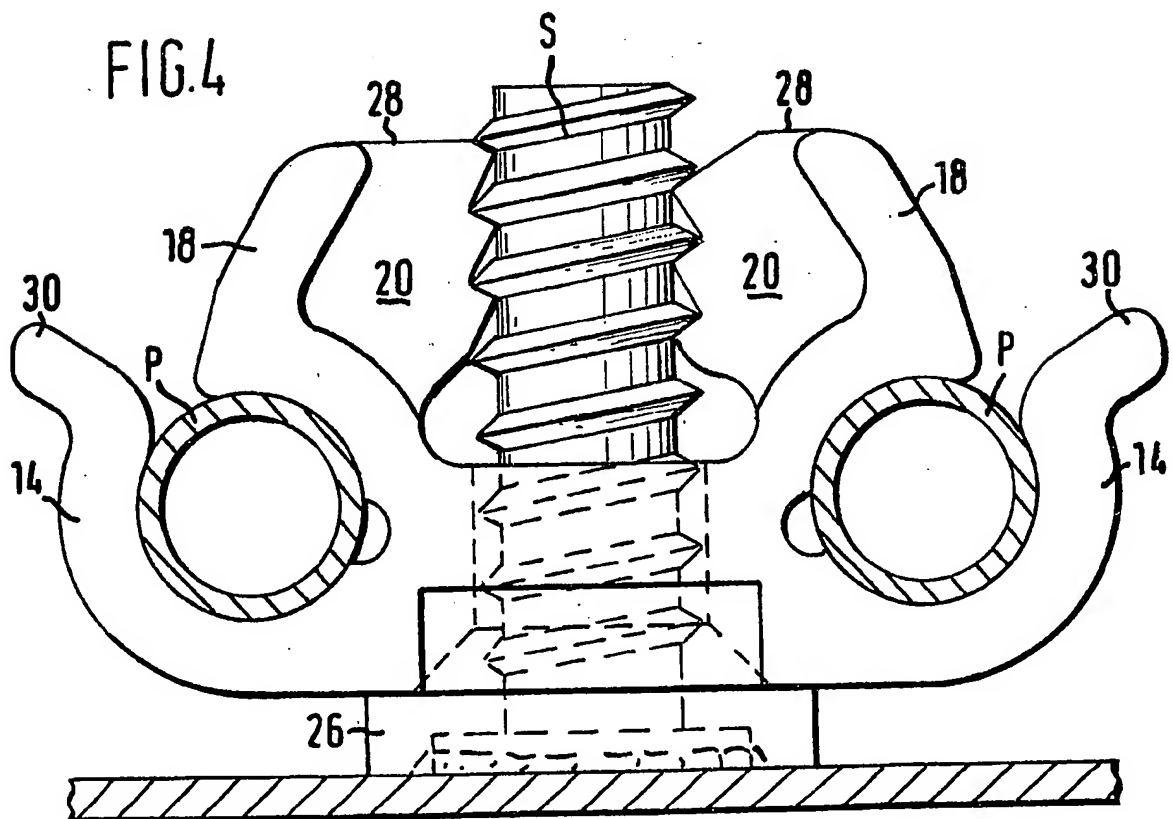
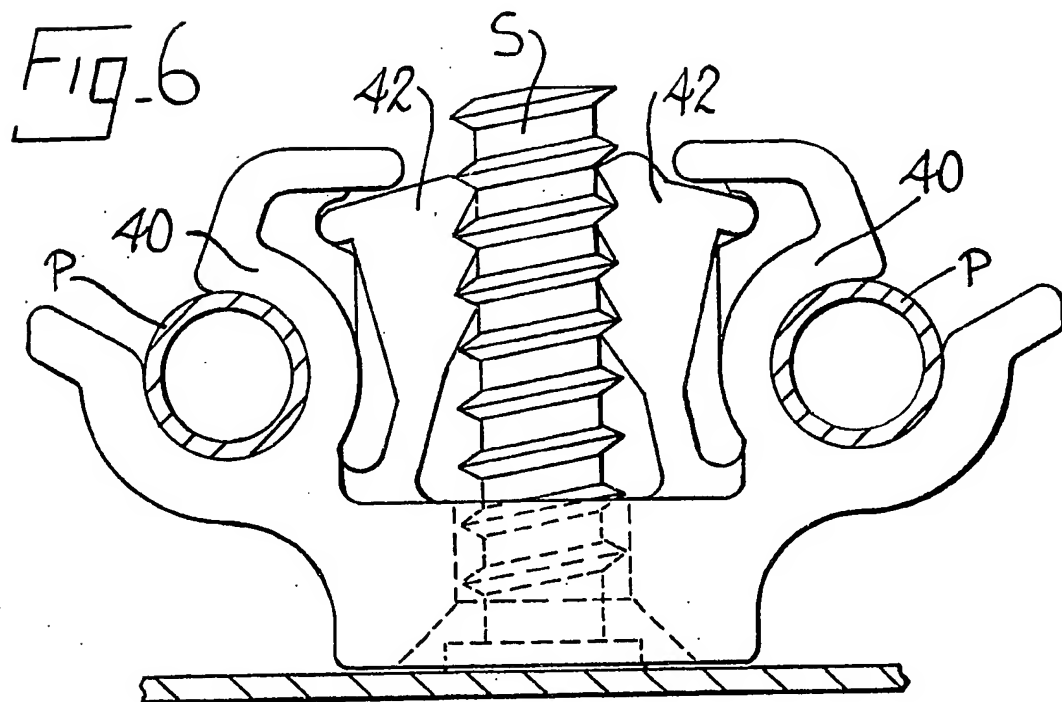
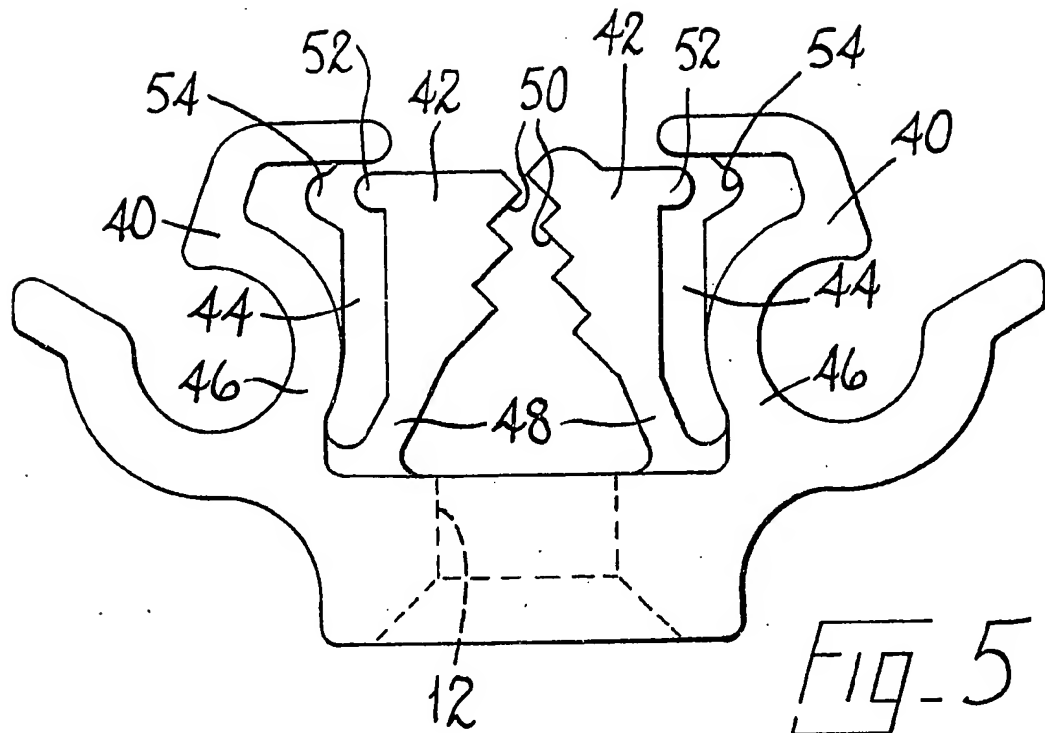


FIG. 4



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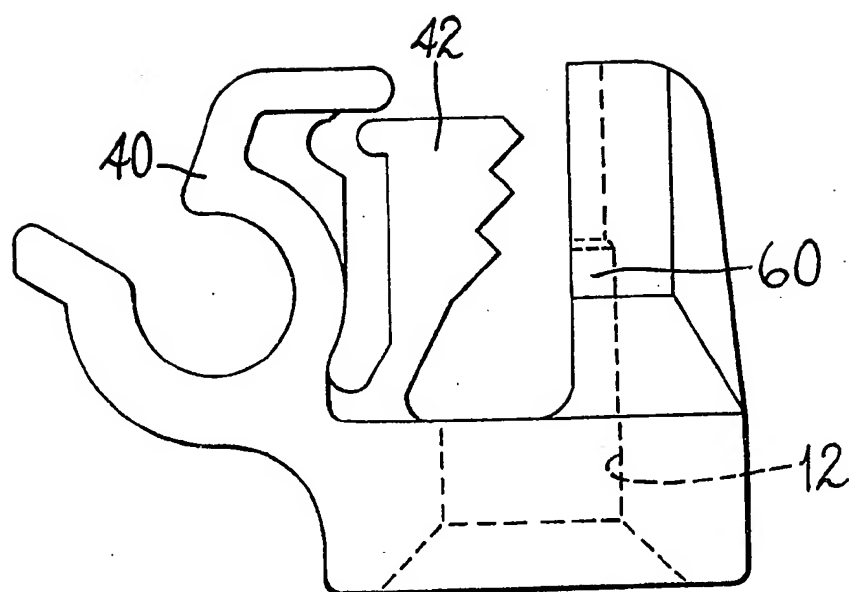


Fig. 7

SPECIFICATION Plastics pipe clip

This invention is concerned with plastics pipe clips of a kind for securing a pipe to a stud projecting from a surface.

It is desirable that pipe clips for attaching pipes to the bodies of motor vehicles are generally easy to assemble, especially where they occur in positions which are difficult of access, and difficult to disassemble so that the pipes are retained securely and will not work loose under conditions of vibration experienced in running the vehicles. An example of a clip of the kind referred to is described in United Kingdom Patent Specification No. 1297663, but while the clip there described secures the pipe against inadvertent release for so long as the pipe clip remains installed on the car body, the clip does not readily lend itself to use on those production lines where pipes are assembled at least partly automatically, for example by assembling pipe runs with the clips on a jig adjacent the line and transferring the resulting assemblage bodily to the car body. Nor does the clip there described enable a procedure to be readily followed where the clip can be assembled on the stud in a partially installed condition ready to receive a pipe and then finally pushed or otherwise moved into a fully securing condition.

It is an object of the invention to provide an improved pipe clip which facilitates the assembly of a pipe in secure relationship to a stud, in the manufacture of a motor vehicle for example.

The invention provides, in one of its several aspects, a plastics clip for securing a pipe to a stud projecting from a surface, comprising a pipe-receiving portion for the pipe and a stud-receiving hole through a body portion of the clip, the axis of the hole lying in a direction transverse to that of a pipe in the pipe-receiving portion, the pipe-receiving portion providing an arcuate wall to embrace a pipe, part of which wall is movable between an open position to admit a pipe and a closed position to retain it, the clip also comprising a stud-engaging portion to engage the stud and hold the clip thereon, characterised in that the movable part of said wall of the pipe-receiving portion is constituted by an element integral with and yieldable relative to the body portion of the clip, at the rear side of which element opposite to said wall is located said stud-engaging portion arranged to overlap said stud-receiving hole so that when the clip is assembled on a study with a pipe in said pipe-receiving portion the stud projects from said hole and engages said stud-engaging portion thereby restricting movement of said element so that it is held in its closed position.

Preferably, in a clip according to the invention, the stud-engaging portion overlapping said hole has teeth for engagement with a toothed configuration of the stud. In order to accommodate the pitch of the stud thread and enable said element to engage the flanks of the thread, the body portion may have resilient feet to

engage the surface from which the stud projects. Furthermore, the clip may have two pipe-receiving portions lying parallel to one another at either side of said hole and the teeth to the rear sides of said element may be staggered so as to register with the thread of a screw-threaded stud.

The stud-engaging portion of a clip in accordance with the invention may be provided by a rear side itself of the yieldable element, or may be provided at the rear side by a finger yieldable independently of said element and separated therefrom by an open channel running parallel to the axis of a pipe in the pipe-receiving portion. Such finger may have a projection for reception in a complementary recess in a rear wall of said yieldable element.

The material of a clip in accordance with the invention may, where said element joins the body portion, be thin and provide a hinge about which said element can rock. Another face of said element remote from said hinge may be flat and so disposed as to be at right angles to the axis of the stud-receiving hole when the element is in its closed position, thereby to facilitate automatic assembly of the clip on a stud. Where a clip in accordance with the invention has a yieldable finger as well as said yieldable element, both may be hinged to the body portion, preferably at different heights from the surface to which the clip will be secured.

Preferably, the pipe-receiving portion of a clip in accordance with the invention has a stiff outer arm which, with the yieldable element, encircles sufficient of a pipe in said portion to ensure its retention even before the clip is assembled on a stud, and the stud-receiving hole in the body portion may have a diameter such that the body portion can initially be held on the tip of the stud, thus enabling an assemblage of pipes and clips to be disposed on a plurality of studs before being pushed into firmly secured positions in which the yieldable elements clamp and lock the pipe or pipes in position.

There now follows a description to be read with reference to the accompanying drawings of three pipe clips embodying the invention and illustrative thereof. These illustrative pipe clips have been selected for description by way of example and not of limitation of the invention.

In the accompanying drawings:—

Figure 1 is a view in side elevation of the first illustrative clip before assembly therein of a pipe;

Figure 2 is a top view of the clip shown in Figure 1;

Figure 3 is an end view of the clip shown in Figure 1;

Figure 4 is a view similar to Figure 1 of the first illustrative clip but showing two pipes retained by the clip and secured to a screw-threaded stud;

Figure 5 and 6 are views in side elevation of the second illustrative clip respectively before and after assembly with two pipes and a stud and;

Figure 7 shows the third illustrative clip.

The first illustrative clip, which is designed to hold two pipes, comprises a body portion 10

through which extends a vertical hole 12 for the reception of a screw-threaded stud S (Figure 4). The diameter of the hole 12 at least at its lower end affords a light attachment to the stud so that

- 5 the clip will be retained temporarily on the top of the study before it is driven fully onto it.
- Two stiff arcuate arms 14 extend outwardly in opposite directions from the body portion and upwardly at each side of the hole 12 and define in
- 10 part the walls of two pipe-receiving portions 16 whose parallel axes lie in a direction at right angles to that of the hole 12. The wall of each portion 16 is also in part provided by a front side of a yieldable element 18 at a rear side of which,
- 15 on a vertical rib 20, there are provided teeth 22 overlapping the hole 12. Each element is joined to the body portion 10 by relatively thin material, which constitutes a resilient hinge 24 about which the element can rock. Each element 18 is thus
- 20 movable between an open position (in which it is moulded, see Figure 1) and a closed, or clamping, position (Figure 4) in which with outer arm 14 will grip a pipe P. It moves from the one position to the other when the clip is pushed fully onto the stud S
- 25 so that the stud comes between the elements 18. The teeth 22 engage the flanks of the thread of the stud S, and when, as shown in the drawings, the stud has a screw thread, the teeth are preferably staggered on the two elements so that
- 30 they register with the thread at both sides of the stud. The teeth of the elements are of the same pitch as the thread of the stud, registration being ensured by resilient feet 26 on the body portion 10 which engage the surface from which the stud projects. The stud may, for example, be welded to this surface.

- In the moulded condition of the illustrative clip, as shown in Figure 1, the ribs 20, which are
- 40 formed with the teeth 22 and are at the rear sides of the elements 18, project close to the axis of the hole 12 so as to overlap it and ensure adequate rocking of the elements about the hinges 24 when the clip is pushed fully onto the stud. Front faces of the elements extend at their free ends close
- 45 enough to the free ends of the arms 14 to ensure loose retention of a pipe in the pipe-receiving portion 16 before the clip is assembled on a stud. Thus an assemblage of pipes and clips for the underside of a car, for example, can be prepared in
- 50 a jig off the car assembly line and transferred as a whole for automatic attachment to the studs on the car body. To facilitate such automatic assembly, upper faces 28 of the elements 18 are preferably flat and slanting inwardly (as shown in the drawings) so that they become horizontal
- 55 when the clip is pushed fully onto a vertical stud.

- Alternatively, the clips can be partially pushed onto the studs so that the studs extend into, but not beyond, the holes 12, and the pipes then
- 60 assembled on the clips, before finally pushing the clips fully on the studs to lock the elements into their clamping, or locking, positions.

- While the outer arms 14 are stiff, and normally remain rigid in application of the pipes, they are
- 65 provided with extended lips 30 by which, with

the aid of a screw-driver or other convenient tool, they can be deflected sufficiently to release the pipes, should it ever be necessary.

- Figures 5 and 6 show the second illustrative clip which differs from the first in that, instead of
- 70 the element 18 with its rib 20 and teeth 22, the yieldable inner walls of the pipe-receiving portions are constituted by pipe-engaging elements 40 and the toothed stud-engaging portions by fingers 42,
- 75 the elements and fingers being separated by open channels 44 lying parallel to the axis of the pipes held in the portions 16. Each element 40 is rockable about a hinge 46 where the material of the clip is thin, and each finger is likewise
- 80 resiliently rockable about a hinge 48. The hinges 46 are higher than the hinges 48, measured from a surface to which the clip will be secured. The fingers 42 have teeth 50, corresponding to the teeth 18 of the first illustrative clip. Projections 52
- 85 on the fingers are arranged to be received in complementary recesses 54 in the rear walls of the elements 40 when the clip is pushed on to a stud.

- The second illustrative clip may be used in the
- 90 same way as the first illustrative clip already described, and pipes assembled in the pipe-receiving portions before pushing the clips finally down on to the studs S (Figure 4). But the second illustrative clip shown in Figure 5 may also, by
- 95 virtue of the greater flexibility afforded by separating the part of the clip that lies between the stud and pipe into two independently rockable parts, be first assembled on a stud, and then the pipes inserted in the clip. In either case,
- 100 interengagement of the projection 52 of the fingers 42 and the recesses 54 of the elements 40 ensures sufficient rigidity after assembly with the pipes and stud to resist loosening of the clip from the stud or the pipes from the clip.

- The different heights of the hinges 46, 48 from the support permits a wide latitude of deflection of the fingers to accommodate the thread of the stud, thus minimising wear on assembly.

- In Figure 6 is shown the third illustrative clip,
- 110 which is the same, in part, as that of Figure 5, but being intended for use with only one pipe, the other pipe-receiving portion has been substituted by a relatively rigid semi-cylindrical wall 60 continuous with the wall of the stud-receiving
- 115 hole so as to provide an intimate abutment for the projecting portion of a stud.

CLAIMS

1. A plastics clip for securing a pipe to a stud projecting from a surface, comprising a pipe-receiving portion for the pipe and a stud-receiving
- 120 hole through a body portion of the clip, the axis of the hole lying in a direction transverse to that of a pipe in the pipe-receiving portion, the pipe-receiving portion providing an arcuate wall to embrace a pipe, part of which wall is movable between an open position to admit a pipe and a closed position to retain it, the clip also comprising a stud-engaging portion to engage the stud and hold the clip thereon, characterised in that the

movable part of said wall of the pipe-receiving portion is constituted by an element integral with and yieldable relative to the body portion of the clip, at the rear side of which element opposite to
 5 said wall is located said stud-engaging portion arranged to overlap said stud-receiving hole so that when the clip is assembled on a stud with a pipe in said pipe-receiving portion, the stud projects from said hole and engages said stud-
 10 engaging portion, thereby restricting movement of said element so that it is held in its closed position.

2. A clip according to claim 1 further characterised in that said stud-engaging portion is
 15 provided by a rear side itself of said element.

3. A clip according to claim 1 further characterised in that said stud-engaging portion is provided by a finger yieldable independently of said element in the relaxed condition of the clip
 20 but arranged to abut the rear side of said element to hold it in its closed position when the clip with a pipe in its pipe-receiving portion is assembled on the stud.

4. A clip according to claim 3 further characterised in that between the finger and said element is an open channel running parallel to the axis of a pipe in the pipe-receiving portion, and the finger has a projection which, when the finger is engaged by a stud, is received in a complementary
 30 recess in a rear wall of said element.

5. A clip according to any one of claims 1 to 4 further characterised in that the said stud-engaging portion overlapping said hole has teeth for engagement with a toothed configuration of
 35 the stud.

6. A clip according to claim 2 further characterised in that its body portion has resilient feet to engage the surface from which the stud projects so as to accommodate the pitch of the stud thread and enable said teeth on the rear side
 40 of said element to engage the flanks of the thread.

7. A clip according to claim 5 further

characterised in that it has two pipe-receiving portions lying parallel to one another at either side
 45 of said hole, the teeth on the stud-engaging portions being staggered so as to register with the thread of a screw-threaded stud.

8. A clip according to any one of the preceding claims further characterised in that the material of the clip where said element joins the body portion
 50 is thin and provides a hinge about which said element can rock.

9. A clip according to claim 8 further characterised in that an upper face of said element
 55 remote from said hinge is flat and so disposed as to be at right angles to the axis of the stud-receiving hole when the element is in its closed position, thereby to facilitate automatic assembly of the clip on a stud.

10. A clip according to claim 3 further characterised in that where said element and said finger join the body portion, the material of the clip is thin and provides hinges about which the element and finger can rock the hinges being so
 60 located to be as at different heights from said surface.

11. A clip according to claim 1 further characterised in that pipe-receiving portion has a stiff outer arm which, with the yieldable element,
 70 retains a pipe in said position even before the clip is assembled on a stud.

12. A clip according to claim 11 further characterised in that the stud-receiving hole is of a diameter to grip a tip of a stud and thereby enable
 75 an assemblage of pipe clips to be disposed on a plurality of studs before being pushed into their secured positions.

13. A clip according to claim 1 further characterised in that it has only one pipe-receiving
 80 portion, the clip having a part-cylindrical wall continuous with the stud-receiving hole and disposed as a rigid abutment on the opposite side of the hole axis from the yieldable element.

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